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pyriform, acuminate below, .0015-.0025 inch long." So far as published reports show, no specimen of *Peridermium* has been recorded since that time having spores of this sort. Among mycologists it generally has been assumed that there must have been some error about Peck's description, and the name has been made to apply to a species having the ordinary small ellipsoid spores. The species to which the name has been thus applied is the one which has been culturally connected with *Cronartium Comptoniae*.

After giving some attention to the matter several years ago the writers came to the conclusion that in Peck's original examination he possibly mistook some of the smaller peridial cells for spores.<sup>1</sup> In studying fresh specimens recently communicated to us from British Columbia, by W. P. Fraser, and from Colorado, by E. Bethel, we have found large pyriform cells which agree exactly in shape and size with the spores of the original description of *Peridermium pyriforme*. It is very evident that in these specimens they can not be peridial cells, for the peridial tissue is present and is composed of very different cells. There seems to be little doubt that we are dealing here with a striking species, very aptly named *Peridermium pyriforme* so many years ago, but which has been unrecognized ever since, while the name has been misapplied. Examination of our herbarium shows that there are a number of other specimens belonging here which had been erroneously, and carelessly, placed under other species. In addition to the three above-mentioned localities we have specimens from Wisconsin, South Dakota, Washington and Alberta. The range for the species is thus seen to be northern United States and southern Canada from ocean to ocean.

Having established the existence of a characteristic heteroecious form of wide geographical range, the question of the alternate phase becomes of immediate interest. Judging from analogy and distribution, together with some field observations, we suggest with much confi-

dence that *Peridermium pyriforme* may be connected with *Cronartium comandrea*.

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July 15, 1913

#### A WINE-RED SUNFLOWER

IN *Popular Science Monthly*, April, 1912, I described the finding and subsequent development of the red sunflower. The darker form predicted for 1912 duly appeared, but most of the intensely red types were bicolored, with the ends of the rays yellow. This is ascribed to the fact that the wild plant (var. *lenticularis*) carries a factor for marking, which is not clearly apparent until joined by the factor for red. In the orange or yellow rayed plants nothing more is apparent to the eye than a deepening of the color on the basal part, not distinctly defined or very readily noticeable. In photographs, however, the marking comes out, as is well shown in Dreer's "Garden Book," 1912, p. 221, for the perennial species. One would imagine from Dreer's figures of "Wolley Dod" and "multiflorus maximus" that the rays were bicolored. A much more striking illustration is given by Mr. G. N. Collins,<sup>1</sup> where *Bidens heterophylla* appears to have strongly bicolored rays when photographed in the ordinary way, but when photographed on an orthochromatic plate with a color screen does not appear bicolored at all. To the eye "the difference in color between the base and tip of the rays is barely perceptible."

We obtained from Sutton, of Reading, England, a variety of *Helianthus annuus* with very dark disc and pale primrose yellow rays. It is a tall, upright form, with the ends of the involucre bracts longer than usual. The seeds are black, or nearly. This plant, which comes quite true from seed, is called by Sutton, "Primrose Perfection"; we will call it var. *primulinus*.

In our red sunflowers so far obtained, the red, however bright, was always chestnut, as the result of the orange background. We saw

<sup>1</sup> See *Bull. Torrey Bot. Club*, 33: 420, 1906.

<sup>1</sup> *Plant World*, November, 1900, plate VII.

at once that if we could get the red (anthocyan) on the primrose background, we should have a quite new and more rosy color. In the summer of 1912 we accordingly crossed the reds with *primulinus*, and obtained a quantity of seed. The *primulinus* was used as the seed plant. As orange was sure to be dominant over primrose (or absence of orange), we could not expect to see our new variety until the  $F_2$  generation. In order to hasten matters, we raised the  $F_1$  generation indoors during the winter, and got enough seed to produce quite a series of plants. The  $F_1$  plants did not differ in any respect from the reds to which we were accustomed, all having a rich orange-yellow background. Some, especially in the larger series now growing in the garden, show extremely rich and deep red colors, so that we should take them for homozygous reds if we did not know otherwise. On July 16 the first of the  $F_2$  plants came into flower, and we were pleased to see that the rays had an entirely new shade of color, wine red on a primrose background. The first one, probably heterozygous for red, was rather dilutely colored, but we now have plants showing rays of a very rich deep wine red, with variable primrose tips. This new variety may be named *vinosus*. It is certainly interesting to obtain in this way an entirely new color, which nevertheless is due entirely to the redistribution of previously known factors, and which could thus be predicted in advance. Up to the time of writing, 21  $F_2$  plants have bloomed, of which 12 are red (of the chestnut type, of several minor varieties, as suffused and bicolored), 8 are *vinosus*, and one is pure primrose like the grandmaternal ancestor. This exactly agrees with the theoretical expectation as regards the reds and the primrose, but we have so far twice as many *vinosus* as expected, and no plain orange-yellows, of which there should be three or four. Probably when all the plants are in bloom the result will agree more exactly with the expectation.<sup>2</sup>

<sup>2</sup> *Postscript*. A census taken August 9 gives 71 red (chestnut), 19 yellow, 25 vinous and 8 primrose. The theoretical expectation for this number is 69 red, 23 yellow, 23 vinous and 8 primrose.

We have obtained a number of other varieties, which will be fully described at some other time. One curious one, which I call *tortuosus*, has the apical half of the rays twisted, as though in curl-papers. We have this both in the plain orange yellow and rich chestnut red with yellow tips, in each case the disc being dark. Similar forms have been obtained at other times by horticulturists.

A collection of seeds shows extraordinary variability in form and color; it would hardly be too much to say that the seeds are less alike than the resulting plants. Thus the tall primrose (*primulinus*) has black or nearly black seeds, Sutton's double primrose has gray seeds streaked with white, while there is a strain of dwarf primrose with perfectly white seeds. Seeds from any one plant are practically uniform, and we do not find any evidence that the pollen used affects the appearance of the resulting seed.

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July 22, 1913

### SOCIETIES AND ACADEMIES

#### THE BIOLOGICAL SOCIETY OF WASHINGTON

THE 512th meeting of the Biological Society of Washington was held in the assembly hall of the Cosmos Club, April 19, 1913, with Vice-president Hay in the chair and about 30 persons present.

Under the heading "Brief Notes and Exhibition of Specimens," Henry Talbott exhibited an unusually large tooth of the fossil shark, *Carcharodon megalodon* from South Carolina and by way of comparison the much smaller teeth of *Odontaspes* from Chesapeake Beach, Md., and made remarks on these sharks.

Wells W. Cooke made remarks on the spring migration, noting that the yellowthroat, redstart, wood thrush and catbird had arrived three days ahead of schedule time.

The regular program consisted of a communication by C. D. Marsh, entitled "Stock Poisoning by Larkspur." He stated that ranchmen of the west had long claimed losses of stock due to larkspur, and on scientific inquiry had found their observations correct, and that the monetary loss was considerable. Although larkspur occurs in other parts of the world, it apparently only causes trouble in the western United States. The average